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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,515	04/10/2001	Thomas P Dick	70006209-1	1240

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EXAMINER
CHUNG, DANIEL J

ART UNIT	PAPER NUMBER
2672	8

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/832,515	DICK ET AL.	
	Examiner	Art Unit	
	Daniel J Chung	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claims 1-14 are presented for examination. This office action is in response to the amendment filed on 8-25-2003.

Specification

Please review the application and correct all informalities.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939).

Regarding claim 1, Tanaka et al discloses that the claimed feature of an interactive method for demonstrating an interrelationship between different representations of a mathematical relationship, including the steps of: (a) defining a mathematical equation ["functional formulas"]; (c) simultaneously displaying at least two of multiple representations of the defined mathematical equation, wherein the available

types of multiple representations include a graphical representation in the form of a graph, a numerical representation in the form of a table of values, and a symbolic representation in the form of an equation expressed in terms of standard mathematical nomenclature, wherein one of the displayed representations is the graphical representation; (c) manipulating [Fig 6B-6D, Fig 16] the graphical representation; and (d) processing the manipulation to substantially simultaneously and correspondingly update the other displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation, whereby a user of the method is able to substantially immediately observe the effect of changes made to the graphical representation via its manipulation on the other of the at least two displayed representations. (See Abstract, col 1 line 40-col 2 line 9)

Tanaka et al does not explicitly disclose that simultaneously displaying two of multiple representations of the mathematical equation and updating the other representation of the mathematical relationship in accordance with the manipulation of the graphical representation. However, such limitations are shown in the teaching of Wada et al. (simultaneously displaying an algebraic formula (i.e. 133,135 in Fig 45, 47) and graphical representation (i.e. 138, 136 in Fig 45, 47), and both are interrelated upon each other, which graphical representation are immediately modified by inputting modified or changed algebraic formula) (See Fig 45-47, Abstract line 6-14, col 3 line 58-col 4 line 4, col 4 line 25-35, col 15 line 13-24, col 21 line 17-29, col 22 line 23-33) It would have been obvious to one skilled in the art to incorporate the teaching of Wada

into the teaching of Tanaka, in order to inform significant results to user with higher operabilities, as such improvement is also advantageously desirable in the teaching of Tanaka for simultaneously displaying multiple graphs based on their display range data with showing coordinates systems in display unit, thereby user do not confuse with other coordinates systems.

Regarding claim 2, Tanaka et al discloses that step of defining a mathematical equation includes selecting ["operating a list key"; A2, S3] a mathematical equation from a list of predefined mathematical equations. (See Abstract line 4-6, Fig 3, Fig 4)

Regarding claim 3, Tanaka et al discloses that the list of predefined mathematical equations includes equations selected from one or more of: (a) linear mathematical relations; (b) polynomial mathematical relations; (c) exponential mathematical relations; (d) logarithmic mathematical relations; (e) power mathematical relations; (f) trigonometric mathematical relations; and (g) conic section mathematical relations. (See Fig 6A)

Regarding claim 4, Tanaka et al discloses that the list of predefined mathematical equations includes at least two equations selected from: (a) a linear mathematical equation described by y=m(x-h)+k; (b) a quadratic mathematical equation described by

y=a(x-h).sup.2+k; ["Y=x.sup.2+3X-5"] (c) a circular mathematical equation described by (x-h).sup.2+(y-k).sup.2=r.sup- .2; (d) an elliptical mathematical equation described by 4 (x - h) 2 a 2 + (y - k) 2 b 2 = 1 ;(e) a hyperbolic mathematical equation described by 5 (x - h) 2 a 2 - (y - k) 2 b 2 = 1 ;(f) a hyperbolic mathematical equation described by 6 (y - k) 2 b 2 - (x - h) 2 a 2 = 1 ;(g) a parabolic mathematical equation described by y=m(x-h).sup.2+k; (h) a parabolic mathematical equation described by (y-k.sup.2)=c(x-h); (i) a general exponential mathematical equation described by y=ba.sup.x+k; (j) a natural exponential mathematical equation described by y=be.sup.ax+k; (k) a logarithmic mathematical equation of the form y=b1n(a(x-h))+k; (l) a power mathematical equation described by y=a(x-h).sup.r+k; (m) a sine mathematical equation described by y=bSin(a(x-h))+k; ["Y=sinx"] and (n) a cosine mathematical equation described by y=bCos(a(x-h))+k; where x and y are variable parameters and a, b, m, h, k and r are parameters according to standard mathematical nomenclature, the numerical values for which included in a particular predefined mathematical relation are user definable. (See Fig 6A)

Regarding claim 5, Tanaka et al discloses that manipulation mechanisms available for manipulating the graphical representation of the mathematical relation include: (a) translating the graph with respect to a set of coordinate axes ["coordinate ranges"]; and (b) dilating the graph with respect to a set of coordinate axes. (See Abstract line 10-17, col 1 line 46-col 2 line 6, Fig 10)

Regarding claim 6, Tanaka fails to teach that using a programmed computer in combination with a stylus device. However, using a stylus device is well known in the art (with touch screen unit), which gives a convenient way to input data in user-friendly manner. Therefore, it would have been obvious to one skilled in the art to employ the stylus device into the teaching of Tanaka.

Regarding claim 7, claim 7 is similar in scope to the claims 1 and 6, and thus the rejections to claims 1 and 6 hereinabove are also applicable to claim 7.

Regarding claims 8-12 and 14, claims 8-12 and 14 are similar in scope to the claims 1-5 and 7, and thus the rejections to claims 1-5 and 7 hereinabove are also applicable to claims 8-12 and 14.

Regarding claim 13, Tanaka et al discloses that a hand-held computer device ["calculator"]. (See Fig 1)

Claims 1-14 are once again rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Negishi (5,210,708).

Regarding claim 1, Tanaka et al discloses that the claimed feature of an interactive method for demonstrating an interrelationship between different

representations of a mathematical relationship, including the steps of: (a) defining a mathematical equation ["functional formulas"]; (c) simultaneously displaying at least two of multiple representations of the defined mathematical equation, wherein the available types of multiple representations include a graphical representation in the form of a graph, a numerical representation in the form of a table of values, and a symbolic representation in the form of an equation expressed in terms of standard mathematical nomenclature, wherein one of the displayed representations is the graphical representation; (c) manipulating [Fig 6B-6D, Fig 16] the graphical representation; and (d) processing the manipulation to substantially simultaneously and correspondingly update the other displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation, whereby a user of the method is able to substantially immediately observe the effect of changes made to the graphical representation via its manipulation on the other of the at least two displayed representations. (See Abstract, col 1 line 40-col 2 line 9)

Tanaka et al does not explicitly disclose that simultaneously displaying two of multiple representations of the mathematical equation and updating the other representation of the mathematical relationship in accordance with the manipulation of the graphical representation. However, such limitations are shown in the teaching of Negishi. (simultaneously displaying an algebraic formula (i.e. 'formula' in 7a of Fig 2B) and graphical representation (i.e. graphical representation in 7b of Fig 2B), and both are interrelated upon each other, which graphical representation are immediately modified

by inputting modified or changed algebraic formula) (See Fig 2B, col 4 line 6-16) It would have been obvious to one skilled in the art to incorporate the teaching of Negishi into the teaching of Tanaka, in order to inform significant results to user with higher operabilities, as such improvement is also advantageously desirable in the teaching of Tanaka for simultaneously displaying multiple graphs based on their display range data with showing coordinates systems in display unit, thereby user do not confuse with other coordinates systems.

Regarding claim 2, Tanaka et al discloses that step of defining a mathematical equation includes selecting ["operating a list key"; A2,S3] a mathematical equation from a list of predefined mathematical equations. (See Abstract line 4-6, Fig 3, Fig 4)

Regarding claim 3, Tanaka et al discloses that the list of predefined mathematical equations includes equations selected from one or more of: (a) linear mathematical relations; (b) polynomial mathematical relations; (c) exponential mathematical relations; (d) logarithmic mathematical relations; (e) power mathematical relations; (f) trigonometric mathematical relations; and (g) conic section mathematical relations. (See Fig 6A)

Regarding claim 4, Tanaka et al discloses that the list of predefined mathematical equations includes at least two equations selected from:: (a) a linear mathematical equation described by y=m(x-h)+k; (b) a quadratic mathematical equation described by y=a(x-h).sup.2+k; ["Y=x.sup.2+3X-5"] (c) a circular mathematical equation described by (x-h).sup.2+(y-k).sup.2=r.sup- .2; (d) an elliptical mathematical equation described by 4 (x - h) 2 a 2 + (y - k) 2 b 2 = 1 ;(e) a hyperbolic mathematical equation described by 5 (x - h) 2 a 2 - (y - k) 2 b 2 = 1 ;(f) a hyperbolic mathematical equation described by 6 (y - k) 2 b 2 - (x - h) 2 a 2 = 1 ;(g) a parabolic mathematical equation described by y=m(x-h).sup.2+k; (h) a parabolic mathematical equation described by (y-k.sup.2)=c(x-h); (i) a general exponential mathematical equation described by y=ba.sup.x+k; (j) a natural exponential mathematical equation described by y=be.sup.ax+k; (k) a logarithmic mathematical equation of the form y=b1n(a(x-h))+k; (l) a power mathematical equation described by y=a(x-h).sup.r+k; (m) a sine mathematical equation described by y=bSin(a(x-h))+k; ["Y=sinx"] and (n) a cosine mathematical equation described by y=bCos(a(x-h))+k; where x and y are variable parameters and a, b, m, h, k and r are parameters according to standard mathematical nomenclature, the numerical values for which included in a particular predefined mathematical relation are user definable. (See Fig 6A)

Regarding claim 5, Tanaka et al discloses that manipulation mechanisms available for manipulating the graphical representation of the mathematical relation include: (a) translating the graph with respect to a set of coordinate axes ["coordinate

ranges"]; and (b) dilating the graph with respect to a set of coordinate axes. (See Abstract line 10-17, col 1 line 46-col 2 line 6, Fig 10)

Regarding claim 6, Tanaka fails to teach that using a programmed computer in combination with a stylus device. However, using a stylus device is well known in the art (with touch screen unit), which gives a convenient way to input data in user-friendly manner. Therefore, it would have been obvious to one skilled in the art to employ the stylus device into the teaching of Tanaka.

Regarding claim 7, claim 7 is similar in scope to the claims 1 and 6, and thus the rejections to claims 1 and 6 hereinabove are also applicable to claim 7.

Regarding claims 8-12 and 14, claims 8-12 and 14 are similar in scope to the claims 1-5 and 7, and thus the rejections to claims 1-5 and 7 hereinabove are also applicable to claims 8-12 and 14.

Regarding claim 13, Tanaka et al discloses that a hand-held computer device ["calculator"]. (See Fig 1)

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,7 and 14 are once again rejected under 35 U.S.C. 102(b) as being anticipated by Wada et al. (5,559,939)

Regarding claim 1, Wada et al discloses that the claimed feature of an interactive method for demonstrating an interrelationship between different representations of a mathematical relationship, including the steps of: (a) defining a mathematical equation (See step F in Fig 3, 46; algebraic expression in regions 133,135 of Fig 4, 45, 47); (b) simultaneously displaying at least two of multiple representations of the defined mathematical equation (See algebraic formula, 133 and graphic representation , 138 in Fig 45; algebraic formula, 135 and block diagram represents the algebraic expression, 136 in Fig 47), wherein the available types of multiple representations include a graphical representation in the form of a graph [138,136], a numerical representation in the form of a table of values, and a symbolic representation in the form of an equation expressed in terms of standard mathematical nomenclature [133,135], wherein one of the displayed representations is the graphical representation [136,138]; (c) manipulating the graphical representation; and (d) processing the manipulation to substantially

simultaneously and correspondingly update the other displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation, whereby a user of the method is able to substantially immediately observe the effect of changes made to the graphical representation via its manipulation on the other of the at least two displayed representations. (See Fig 45-47, Abstract line 6-14, col 3 line 58-col 4 line 4, col 4 line 25-35, col 15 line 13-24, col 21 line 17-29, col 22 line 23-33)

Regarding claims 7 and 14, claims 7 and 14 are similar in scope to the claim 1, and thus the rejections to claim 1 hereinabove is also applicable to claims 7 and 14.

Response to Arguments/Amendments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Chung whose telephone number is (703) 306-3419. He can normally be reached Monday-Thursday and alternate Fridays from 7:30am- 5:00pm. If attempts to reach the examiner by

telephone are unsuccessful, the examiner's supervisor, Michael, Rezavi, can be reached at (703) 305-4713.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

djc
November 4, 2003

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600